CLAIMS

1. A method for communicating data in a wellbore having a drill string, comprising:

using a first telemetry transmitter coupled to the drill string to transmit a first data stream through a first communications channel;

using a second telemetry transmitter coupled to the drill string to transmit a second data stream through a second communications channel;

wherein said first data stream and said second data stream are each independently interpretable without reference to data provided up the other of the communications channels.

2. The method of claim 1 further comprising:

using a third telemetry transmitter coupled to the drill string to transmit a third data stream through a third communications channel;

wherein said third data stream is independently interpretable without reference to data provided up the first and the second communications channels.

3. The method of claim 1, wherein the first telemetry transmitter and the second telemetry transmitter transmit their data simultaneously.

4. The method of claim 1, wherein the first telemetry transmitter and the second telemetry transmitter do not transmit data at the same time.

5. The method of claim 2, wherein the first telemetry transmitter and the second telemetry transmitter and the third telemetry transmitter transmit their data simultaneously.

6. The method of claim 2, wherein the second telemetry transmitter and the third telemetry transmitter transmit their data simultaneously, and wherein

the first telemetry transmitter does not transmit data at the same time as the second telemetry transmitter and the third telemetry transmitters.

7. The method of claim 1 wherein the first telemetry transmitter is a mud-based acoustic telemetry device and the second telemetry transmitter is a tubular-based acoustic telemetry device.

8. The method of claim 1 wherein the first telemetry transmitter is a mud-based acoustic telemetry device and the second telemetry transmitter is an electromagnetic telemetry device.

9. The method of claim 1 wherein the first telemetry transmitter is an electromagnetic telemetry device and the second telemetry transmitter is a tubular-based acoustic telemetry device.

10. The method of claim 2 wherein the first telemetry transmitter is a mud-based acoustic telemetry device;

the second telemetry transmitter is a tubular-based acoustic telemetry device; and

the third telemetry transmitter is an electromagnetic telemetry device.

11. The method of claim 6, wherein the first telemetry transmitter is a mud-based acoustic telemetry device;

the second telemetry transmitter is a tubular-based acoustic telemetry device; and

the third telemetry transmitter is an electromagnetic telemetry device.

12. A method for communicating data in a wellbore having a drill string forming a tubular communications channel and through which drilling mud flows during drilling operations forming a mud communications channel, comprising:

using a first acoustic transducer coupled to the drill string to transmit a first data stream through a first communications channel;

using a second acoustic transducer coupled to the drill string to transmit a second data stream through a second communications channel;

wherein said first data stream and said second data stream are each independently interpretable without reference to data provided up the other of the communications channels.

13. The method of claim 12, wherein the first acoustic transducer is a mud-based telemetry device and the first communications channel is the mud channel; and

wherein the second acoustic transducer is a tubular-based telemetry device and the second communications channel is the tubular channel.

14. The method of claim 13, wherein the mud-based telemetry device is a mud pulser.

15. The method of claim 13, wherein the mud-based telemetry device is a mud siren.

16. The method of claim 13, wherein the tubular-based telemetry device comprises a piezoelectric stack.

17. The method of claim 13, wherein the tubular-based telemetry device comprises a magnetostrictive element.

18. A method for communicating data in a wellbore having a drill string forming a tubular communications channel and through which drilling mud flows during drilling operations forming a mud communications channel, comprising:

using a mud-based acoustic telemetry device coupled to the drill string to transmit data through the mud channel when mud is flowing;

using a tubular-based acoustic telemetry device coupled to the drill string to transmit data through the tubular channel when active drilling is not occurring.

19. The method of claim 18, wherein the mud-based telemetry device is used only when active drilling is occurring.

20. The method of claim 18, wherein the tubular-based telemetry device is used only when active drilling is not occurring.

21. The method of claim 20, wherein the tubular-based telemetry device is used only when mud is not flowing.

22. The method of claim 18, wherein the data is communicated using only one device and one channel at a time.

23. The method of claim 22, wherein the data alternates between communication using the mud-based telemetry device through the mud channel when mud is flowing and communication using the tubular-based telemetry device through the tubular channel when mud is not flowing.

24. The method of claim 22, wherein the data alternates between communication using the mud-based telemetry device through the mud channel when active drilling is occurring and communication using the tubular-based telemetry device through the tubular channel when active drilling is not occurring.

25. A method for communicating data in a wellbore wherein the earth forms an electromagnetic communications channel and having a drill string through which drilling mud flows during drilling operations forming a mud communications channel, comprising:

using a mud-based acoustic telemetry device coupled to the drill string to transmit data through the mud channel when mud is flowing;

using an electromagnetic telemetry device coupled to the drill string to transmit data through the electromagnetic channel when active drilling is not occurring.

26. The method of claim 25, wherein the mud-based telemetry device is used only when active drilling is occurring.

27. The method of claim 25, wherein the electromagnetic telemetry device is used only when active drilling is not occurring.

28. The method of claim 27, wherein the electromagnetic telemetry device is used only when mud is not flowing.

29. The method of claim 25, wherein the data is communicated using only one device and one channel at a time.

30. The method of claim 29, wherein the data alternates between communication using the mud-based telemetry device through the mud channel when mud is flowing and communication using the electromagnetic telemetry device through the electromagnetic channel when mud is not flowing.

31. The method of claim 29, wherein the data alternates between communication using the mud-based telemetry device through the mud channel when active drilling is occurring and communication using the electromagnetic telemetry device through the electromagnetic channel when active drilling is not occurring.

32. A method for communicating data in a wellbore wherein the earth forms an electromagnetic communications channel and having a drill string forming a tubular communications channel, comprising:

using an electromagnetic telemetry device coupled to the drill string to transmit data through the electromagnetic channel when active drilling is occurring;

using a tubular-based acoustic telemetry device coupled to the drill string to transmit data through the tubular channel when active drilling is not occurring.

33. The method of claim 32, wherein the electromagnetic telemetry device is used only when active drilling is occurring.

34. The method of claim 32, wherein the tubular-based telemetry device is used only when active drilling is not occurring.

35. The method of claim 32, wherein the data is communicated using only one device and one channel at a time

36. The method of claim 35, wherein the data alternates between communication using the electromagnetic telemetry device through the electromagnetic channel when active drilling is occurring and communication using the tubular-based telemetry device through the tubular channel when active drilling is not occurring.

37. A method for communicating data in a wellbore wherein the earth forms an electromagnetic communications channel and having a drill string forming a tubular communications channel and through which drilling mud flows during drilling operations forming a mud communications channel, comprising:

using a mud-based acoustic telemetry device coupled to the drill string to transmit data through the mud channel when mud is flowing;

using a tubular-based acoustic telemetry device coupled to the drill string to transmit data through the tubular channel when active drilling is not occurring; and

using an electromagnetic telemetry device coupled to the drill string to transmit data through the electromagnetic channel when active drilling is not occurring.

38. The method of claim 37, wherein the mud-based telemetry device is used only when active drilling is occurring.

39. The method of claim 37, wherein the tubular-based acoustic telemetry device is used only when active drilling is not occurring.

40. The method of claim 37, wherein the electromagnetic telemetry device and the tubular-based acoustic telemetry device are used only when mud is not flowing.

41. The method of claim 37, wherein at any one time the data is communicated using either only the mud-based acoustic telemetry device or only at least one of the tubular-based acoustic telemetry device and the electromagnetic telemetry device.

42. The method of claim 41, wherein the data alternates between communication using the mud-based telemetry device through the mud channel when mud is flowing and communication using at least one of the electromagnetic telemetry device through the electromagnetic channel and the tubular-based telemetry device through the tubular channel when mud is not flowing.

43. The method of claim 41, wherein the data alternates between communication using the mud-based telemetry device through the mud channel when mud is flowing and

communication using both of the electromagnetic telemetry device through the electromagnetic channel and the tubular-based telemetry device through the tubular channel when mud is not flowing.

44. The method of claim 41, wherein the data alternates between communication using the mud-based telemetry device through the mud channel when active drilling is occurring and communication using at least one of the electromagnetic telemetry device through the electromagnetic channel and the tubular-based telemetry device through the tubular channel when active drilling is not occurring.

45. The method of claim 41, wherein the data alternates between communication using the mud-based telemetry device through the mud channel when active drilling is occurring and communication using both of the electromagnetic telemetry device through the electromagnetic channel and the tubular-based telemetry device through the tubular channel when active drilling is not occurring.

46. A method for communicating data in a wellbore having a drill string through which drilling mud flows during drilling operations, comprising:

using a first telemetry transmitter coupled to the drill string to transmit a first data stream through a first communications channel;

using a second telemetry transmitter coupled to the drill string to transmit a second data stream through a second communications channel;

wherein said second data stream comprises selected duplicated elements of said first data stream and wherein each data stream and such elements are each independently interpretable without reference to data provided up the other of the communications channels.

47. The method of claim 46 wherein the method is for communicating data in a wellbore having a drill string forming a tubular communications channel and through which drilling mud flows during drilling operations forming a mud communications channel, wherein:

the first telemetry transmitter is a first acoustic transducer; and

the second telemetry transmitter is a second acoustic transducer.

48. The method of claim 47, wherein the first acoustic transducer is a tubular-based telemetry device and the first communications channel is the tubular channel; and

wherein the second acoustic transducer is a mud-based telemetry device and the second communications channel is the mud channel.

49. The method of claim 46, wherein the method is for communicating data in a wellbore having a drill string forming a tubular communications channel and through which drilling mud flows during drilling operations and wherein the earth forms an electromagnetic communications channel, wherein:

the first telemetry transmitter is an electromagnetic telemetry device and the first communications channel is the electromagnetic channel; and

the second telemetry transmitter is a tubular-based telemetry device and the second communications channel is the tubular channel.

50. The method of claim 46, wherein the method is for communicating data in a wellbore having a drill string through which drilling mud flows during drilling operations forming a mud-based communications channel and wherein the earth forms an electromagnetic communications channel, wherein:

the first telemetry transmitter is a mud-based acoustic telemetry device and the first communications channel is the mud channel; and

the second telemetry transmitter is an electromagnetic telemetry device and the first communications channel is the electromagnetic channel.

51. The method of claim 48, wherein the data stream communicated up the mud channel comprises selected duplicated elements of said first data stream and priority data.

52. The method of claim 48, wherein the data stream communicated up the mud channel comprises selected duplicated elements of said first data stream and steering data.

53. The method of claim 48, wherein the data stream communicated up the mud channel comprises selected duplicated elements of said first data stream and safety data.

54. The method of claim 48, wherein the first stream of data comprises the majority of a selected stream of formation evaluation data being collected.

55. The method of claim 46, wherein the first stream of data comprises the majority of the formation evaluation data being collected.

56. The method of claim 46, wherein the selected duplicated elements of said first data stream comprise a sampling of elements of said first data stream.

57. The method of claim 51, wherein the sampling of elements is one out of every ten elements.

58. The method of claim 46, wherein the selected duplicated elements of said first data stream comprise a duplicate of every tenth element of said first data stream.

59. The method of claim 46, wherein said first data stream comprises at least two multiplexed data streams;

wherein said second data stream comprises at least two multiplexed data streams;

wherein a first of the multiplexed streams of the second data stream comprises selected duplicated elements of a first of the multiplexed streams of the first data stream; and

wherein a second of the multiplexed streams of the first data stream comprises selected duplicated elements of a second of the multiplexed streams of the second data stream.

60. A method for communicating data in a wellbore having a drill string forming a tubular communications channel and through which drilling mud flows during drilling

operations forming a mud communications channel and wherein the earth forms an electromagnetic communications channel, comprising:

using a first telemetry transmitter coupled to the drill string to transmit a first collection of data through a priority communications channel, wherein the first collection of data comprises priority data;

using a second telemetry transmitter coupled to the drill string to transmit a second collection of data through a secondary communications channel, wherein the second collection of data comprises formation evaluation data;

wherein each collection of data is independently interpretable without reference to data provided up the other of the communications channels.

61. The method of claim 60 wherein:

the first telemetry transmitter is a first acoustic transducer; and

the second telemetry transmitter is a second acoustic transducer.

62. The method of claim 61, wherein:

the first acoustic transducer is a mud-based telemetry device and the priority communications channel is the mud channel; and

wherein the second acoustic transducer is a tubular-based telemetry device and the secondary communications channel is the tubular channel.

63. The method of claim 62, wherein the mud-based telemetry device is a mud pulser.

64. The method of claim 62, wherein the mud-based telemetry device is a mud siren.

65. The method of claim 62, wherein the tubular-based telemetry device comprises a piezoelectric stack.

66. The method of claim 62, wherein the tubular-based telemetry device comprises a magnetostrictive element.

67. The method of claim 60, wherein:

the first telemetry transmitter is an electromagnetic telemetry device and the priority communications channel is the electromagnetic channel; and

the second telemetry transmitter is a tubular-based telemetry device and the secondary communications channel is the tubular channel.

68. The method of claim 60, wherein:

the first telemetry transmitter is a mud-based telemetry device and the priority communications channel is the mud channel; and

the second telemetry transmitter is an electromagnetic telemetry device and the secondary communications channel is the electromagnetic channel.

69. The method of claim 60, wherein the first collection of data communicated through the priority channel comprises steering data.

70. The method of claim 60, wherein the first collection of data communicated through the priority channel comprises safety data.

71. The method of claim 69, wherein the steering data communicated through the priority channel comprises directional steering data.

72. The method of claim 69, wherein the steering data communicated through the priority channel comprises formation steering data.

73. The method of claim 60, wherein the first collection of data communicated through the priority channel further comprises quality of log data.

74. The method of claim 60, wherein the formation evaluation data communicated through the secondary channel comprises formation tester data.

75. The method of claim 60, wherein the formation evaluation data communicated through the tubular channel comprises the majority of a selected stream of formation evaluation data being collected.

76. The method of claim 60, wherein the formation evaluation data communicated through the tubular channel comprises the majority of the formation evaluation data being collected.

77. The method of claim 60, wherein the first collection of data communicated through the priority channel comprises the majority of a selected stream of formation evaluation data being collected.

78. The method of claim 60, wherein the data communicated through the secondary channel consists essentially of formation evaluation data.

79. The method of claim 60, wherein the data communicated through the priority channel consists essentially of priority data and quality of log data.

80. The method of claim 60, wherein the data communicated through the priority channel consists essentially of priority data.

81. The method of claim 60, further comprising:

using a third telemetry transmitter coupled to the drill string to transmit a third collection of data through a tertiary communications channel, wherein the third collection of data comprises formation evaluation data; and

wherein the third collection of data is independently interpretable without reference to data provided up either of the other communications channels